Contingency Plans

OSIRIS-REx Project Systems Engineering has identified several key contingency scenarios, mostly relating to the loss of an instrument, that are documented in individual contingency plans. These are guideline documents that describe how certain products might be recovered using other observations. These are not “recipes” for contingencies, but rather identify issues and describe a general approach that should be pursued in the event a contingency is realized.

Anomalous Sampling Attempt

This contingency is described by the document titled Anomalous Sampling Attempt Contingency Plan Associated with the Design Reference Mission (DRM) OSIRIS-REx-PLAN-0054 (April 30, 2015). It defines several plausible scenarios that include as common elements 1) the decision to attempt sample collection (i.e. go beyond the termination point of the Matchpoint Rehearsal), and 2) potential flight system interaction with the surface, including surface contact of the TAGSAM head, release of the collection gas after the Matchpoint maneuver, firing the backaway thrusters after the Matchpoint maneuver, and combinations of these.

(See OSIRISREXDRMAnomalousSamplingAttemptContingencyPlanRevision-PDF)

Natural Satellite Detection and Characterization

Detection of a Natural Satellite Contigency Plan Associated with the Design Reference Mission and Mission Plan (DRM) OSIRIS-REx-PLAN-0056 (March 25, 2015). This document describes a contingency scenario where a satellite is found to be orbiting in the vicinity of Bennu during the natural satellite search on approach. This will trigger a pre-planned halt in the asteroid approach and operations profile that allows the team to characterize the satellite and re-plan the DRM as necessary in order to assure a safe and successful sample collection.

(See OSIRISREXDRMDetectionofaNaturalSatelliteContingencyPlanRevision-Approved-PDF)

Detection of a Dust Plume

Detection of a Dust Plume Contingency Plan Associated with the Design Reference Mission (DRM) OSIRIS-REx-PLAN-0057 (Draft Version, June 2016). This plan describes the activities that will allow the Flight and Science Teams to characterize the spatial, temporal and physical characteristics of any dust and gas plumes and re-plan the mission as necessary to safely continue in the presence of known hazards. This is not a comprehensive step-by-step plan because the applicability of the actions/activities can vary widely depending on the nature and variability of the detected plume.

(See DETECTIONOFADUSTPLUMEContingencyPlan-ReadyforCM PDF)

Loss of Polycam and Mapcam

Loss of PolyCam or MapCam Contingency Plan Associated with the Design Reference Mission (DRM), OSIRIS-REx-PLAN-0058, (Draft Version, June 2016). This document provides contingency plans in the event of the loss of one of either PolyCam or MapCam before arrival at Bennu. It examines each scenario individually. In the first scenario, PolyCam is lost, but MapCam is available. In the second scenario, MapCam is lost, but PolyCam is available. Both examples assume no loss of OLA. The document summarizes the major impacts of the loss of each camera and how the mission will attempt to recover from each contingency. Because PolyCam and MapCam provide mission-critical data, and the mission must be single-fault tolerant to achieving the threshold mission, this contingency plan is developed for utilizing the functional redundancy provided by the cameras in the OCAMS suite and by other instruments that are part of the OSIRIS-REx payload.

(See LossofPolyCamorMapCamContingencyPlan-ReadyforCM PDF)

Loss of Samcam

Loss of SamCam Contingency Plan, OSIRIS-REx-Plan-0059 (June 18, 2015). This plan describes the activities that will allow the Flight Team (FT) to continue the mission in the event SamCam cannot successfully collect the TAGSAM head inspection images.

(See LossofSamCamContingencyPlanRevision- PDF)

Loss of Spectrometers

Loss of Spectrometers Contingency Plan OSIRIS-REx-OPS-006, (August 31, 2015). This document provides contingency plans in the event of the loss of one of the spectrometers before arrival at Bennu. Two scenarios are examined. In the first, the OVIRS spectrometer is lost, but OTES retained. In the second scenario, OTES is lost, but OVIRS retained. Both examples assume no loss of OCAMS or OLA facilities. The document summarizes the major impacts of the loss of each instrument and how the mission will attempt to recover from each contingency.

(See ContingencyPlanLossofSpectrometersRevision-Released PDF)

Loss of OLA

Loss of OLA Contingency Plan Associated with the Design Reference Mission (DRM) OSIRIS-REx-PLAN-0060 (September 24, 2014.) The document considers the impact of losing the OSIRIS-REx Laser Altimetry (OLA) on achieving the OSIRIS-REx mission operations. It discusses an OLA failure but assumes a GN&C lidar of limited capability is available with resources provided for scientific processing and analysis of the GN&C data by the Altimetry (as well as Radio and Sample Site Science) Working Groups. The document only considers the operational consequences of OLA failure. (Editors note: With the new importance of OLA in providing landmark maplets to NFT, this document should probably be considered out of date. A discussion of how stereophotoclinometry can fill in for a loss of OLA in providing the needed products is advisable.)

(See OSIRIS-REx-PLAN-0060DRMLossofOLAContingencyPlan2014-08-15Rev(-)